



Linking Informatics of Neuroscience Communities

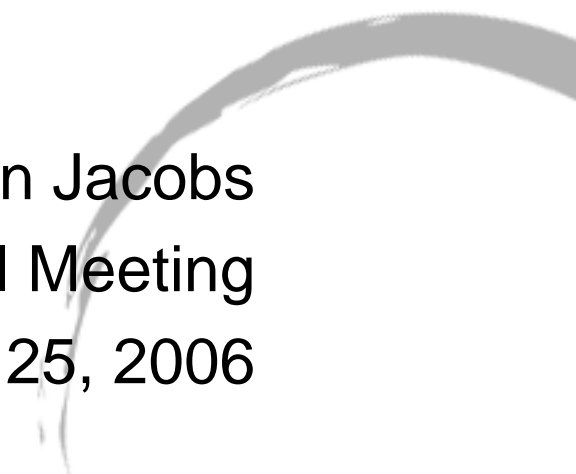
NIH Blueprint Workshop

March 30 - 31, 2006

Gwen Jacobs

HBP Annual Meeting

April 24 - 25, 2006



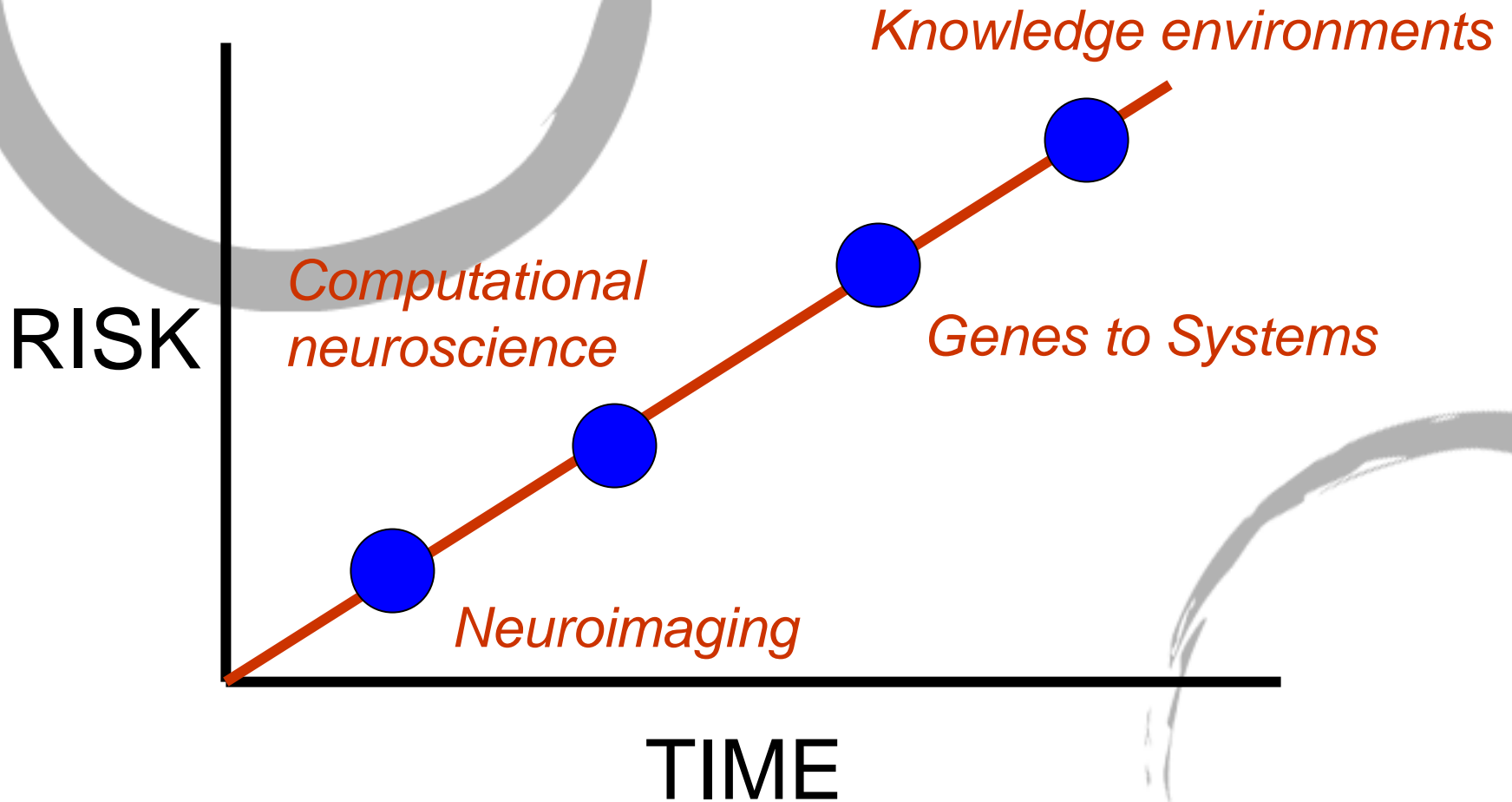
LINC Workshop Goals

- To explore how to make specific, substantive, informatics-related links across existing projects that are supported under one of several coordinated initiatives.
- To identify opportunities that might be started and pursued over a short time frame, rather than a discussion of grand challenges that might be pursued over the next ten years.
- Connections made over the near-term will have long-term effects.

Working Groups

- Neuroimaging informatics
 - Allen Evans, Jeff Grethe, Steve Strother, David VanEssen, Jack VanHorn
- Computational Neuroscience
 - Giorgio Ascoli, Emery Brown, Yoon Suck Choe, Kristen Harris, Gwen Jacobs
- Genes to Systems
 - Huda Akil, Mark Ellisman, Art Toga, Rob Williams,
- Knowledge Environments
 - Dan Gardner, Mark Musen, Eric Neumann, Ken Smith

Diagram of opportunities



LINC – Neuroimaging Informatics Break-Out Group

Goals:

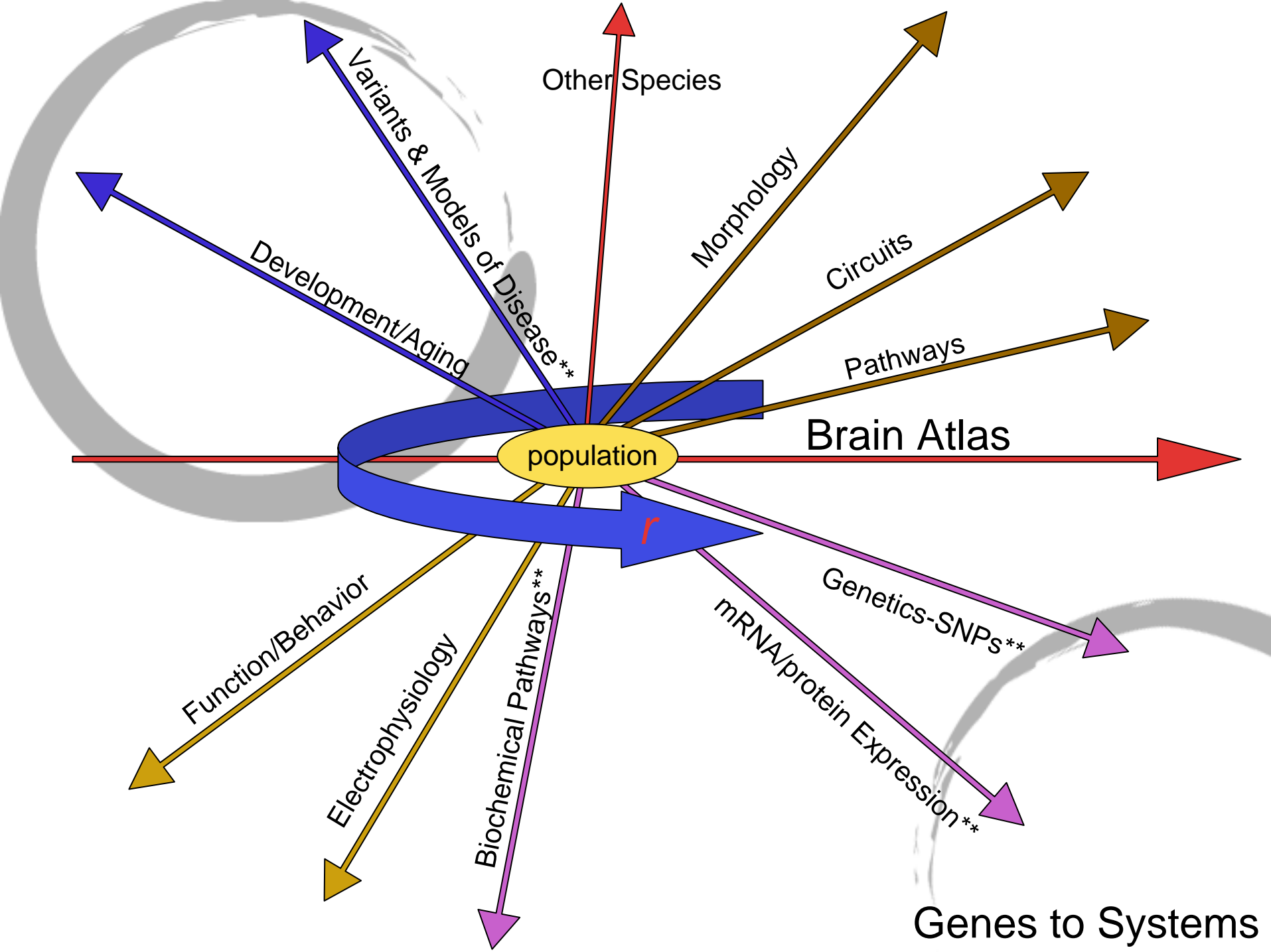
1. **Facilitate algorithm evaluations using real and simulated neuroimaging data sets having one or more functional tasks and one or more anatomical image volumes**

Using -

1. Identified best practices for several key image file formats and schemas
 2. Annotated meta-data (e.g. RDF)
 3. Promote “Best Practices” for presenting/describing the data
 4. Made easily and publicly available
2. **Facilitate bottom-up interaction between neuroimaging community and NCBO, “tool clearing-house”, etc**
 1. Identify neuroimaging friendly common collaborative tool sets
 2. Identify communities best suited to contribute to ontology design
e.g. Represented by all NIH-sponsored groups in this room
 3. **Encourage the development of a resource describing detailed mappings between all major brain atlases for all major species**

Informatics support for collaboration in computational neuroscience

- Can informatics tools be used to support a collaboration that spans hypothesis testing, data collection, data analysis, modeling and analysis of model predictions, spanning the synapse to the circuit?
- Hypothesis
 - Age related changes in synapses and cell shape affect response properties
- Experiments
 - Anatomical - ultrastructure, cell level, system
 - Physiological - spike trains, subthreshold recordings
- Data
 - Ultrastructure, 3D reconstructions - cell level, systems level,
 - Physiological data
- Analysis
 - Statistical analysis of anatomical and time series data
 - Modeling environments - Neuron, Genesis, Catacomb
- Database
 - Where to store the data?



Needed Links

- **Projections/Circuits**

- HBP other atlases
- Gensat/Projectional Pathways

- **Molecular Links**

- Genes/Chromosomal locations/SNPs (NCBI)
- Gene Expression- Profiling (GeneNetwork) & Anatomical (e.g. Gensat/Allen)
- Protein structure & Proteomics
- Molecular Pathways (gene ontologies, networks, etc)

- **Functional Links**

- Electrophysiology
- Regulation (secretion, modulation of expression)
- Behavior

- **Models of Disease**

- Normal Variations
- Mouse Models
- Preclinical Research on treatment strategies or novel targets (*combinatorial molecular library info?*)

- **Other Species**

- Rats
- Humans
- Others

Knowledge Environments: now

- Focusing on neuroinformatic tools and methods that present, integrate, and relate data to aid investigators to analyze and synthesize findings and models drawn from them by:
 - describing broader types of brain data and allied experimental conditions
 - providing analytic tools for brain data,
 - extending the types of analysis available to researchers, intelligent matching of data and analytic algorithms and methods

Knowledge Environments: soon

- Working toward a future:
 - integration of neuroinformatic resources
 - towards building knowledge bases and knowledge environments
 - with the goal of enhancing and extending data with results, conclusions, and inferences derived from the data

Charge to breakout groups

- *Neuroscience Requirements and Existing Solutions*
 - *Mark Ellisman*
- *Structural and Functional Imaging*
 - *David Van Essen*
- *Physiological Data and Simulation*
 - *Esther Gardner*
- *Ontologies and Standards*
 - *Perry Miller*
- *Information Systems*
 - *Ken Smith*
- *Data and Text Mining*
 - *Neil Smalheiser*